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Bloated bodies and broken bricks: Power, ecology, and inequality in the political economy of natural disaster recovery

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ABSTRACT

Disaster recovery efforts form an essential component of coping with unforeseen events such as earthquakes, hurricanes, floods, and typhoons, some of which will only become more frequent or severe in the face of accelerated climate change. Most of the time, disaster recovery efforts produce net benefits to society. However, depending on their design and governance, some projects can germinate adverse social, political, and economic outcomes. Drawing from concepts in political economy, political ecology, justice theory, and critical development studies, this study first presents a conceptual typology revolving around four key processes: enclosure, exclusion, encroachment, and entrenchment. Enclosure refers to when disaster recovery transfers public assets into private hands or expands the roles of private actors into the public sphere. Exclusion refers to when disaster recovery limits access to resources or marginalizes particular stakeholders in decision-making activities. Encroachment refers to when efforts intrude on biodiversity areas or contribute to other forms of environmental degradation. Entrenchment refers to when disaster recovery aggravates the disempowerment of women and minorities, or worsens concentrations of wealth and income inequality within a community. The study then documents the presence of these four inequitable attributes across four empirical case studies: Hurricane Katrina reconstruction in the United States, recovery efforts for the 2004 tsunami in Thailand, Typhoon Yolanda in the Philippines, and the Canterbury earthquakes in New Zealand. It next offers three policy recommendations for analysts, program managers, and researchers at large: spreading risks via insurance, adhering to principles of free prior informed consent, and preventing damage through punitive environmental bonds. The political economy of disaster must be taken into account so that projects can maximize their efficacy and avoid marginalizing those most vulnerable to those very disasters.

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1. Introduction

Sometimes, the human response to a natural disaster can exacerbate its impact, even more than the event itself. Kates, Colten, Laska, and Leatherman (2006: 14659) write “because disasters tend to accelerate existing economic, social, and political trends, the trajectory for full recovery (preexisting population, economy, and infrastructure) is not promising.” Laska and Morrow (2006: 16) argue that the “goal of disaster resilient communities cannot be reached until basic issues of inequality and social justice are addressed.” Bullard and Wright (2009: xxv) add “Quite often, the

scale of a disaster's impact ... has more to do with the political economy of the country, region, and state than with the hurricane's category strength.” Their statements underline a stream of research showing how natural disasters are worsened by human factors such as mismanagement, underdevelopment, profiteering, neoliberal capitalism, and crisis politics (Hinchcliffe and Woodward, 2004; Klein, 2008; Weber and Messias, 2012; Cretney, 2017; Sovacool, 2017, 2018). Viewed in this manner, disasters are more “catastrophes in the making” (Freudenburg, Gramling, Laska, & Erikson, 2009), “unnatural disasters” (Laska and Morrow 2006), and “disasters by design” (Mileti, 1999) instead of random events, by no means the result of biophysical or natural phenomenon alone.

So far, however, research on these types of political economy pressures and disaster recovery (DR) remains scant. Neumayer et al. (2014) offer a compelling assessment of how governments underinvest in DR efforts. Oh and Reuveny (2010) discuss the

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politics of natural disasters from the perspective of international trade. [Cutter et al. \(2014\)](#) explore the dynamics (and geographies) of community resilience to disaster. [D'Alisa and Kallis \(2016\)](#) offer an intriguing connection between Gramscian theories of the state and the political ecology of some types of DR, framed around the notion of climate change adaptation; [Cretney \(2017\)](#) examines the discursive elements of DR and “geographies of crisis.”

In contrast to these works, we aim to offer a conceptual typology that makes mapping political economy pressures more transparent and systematic, in the hope that the vulnerabilities they give rise to can be better managed and minimized. In this study, to conceptualize how DR efforts may encounter issues of injustice, vulnerability, and inequality, we synthesize from four distinct schools of thought: political economy, political ecology, social justice, and critical development studies. Political economy broadly deals with how (capitalist) markets interact with the interests of state actors (government). Political ecology deals broadly with the winners and losers of environmental change (and responses to it). Social justice concerns itself with the distribution of costs and benefits as well as decision-making processes (and forums for due process and representation therein). Critical development studies has emerged to critique an overly reductionist, top-down approach to development assistance and policy that seeks to remake the developing world in the image of western (or Northern) industrialized countries.

Drawing from these admittedly diverse literatures, we propose that DR efforts can, at times, propagate four interconnected political economy processes that operate systemically. Enclosure refers to when public assets become privatized or private actors extend their reach and autonomy into the public sphere. Exclusion refers to when DR actors marginalize particular groups in decision-making fora. Encroachment refers to when DR projects damage the environment, notably biodiversity conservation zones or fragile ecosystems. Entrenchment refers to when DR projects worsen social or economic inequality. Through four case studies we show how DR projects can exacerbate poverty, racism, sexism, and classism (the United States), entrench and aggravate poverty (Thailand and Philippines), and marginalize local communities while slowing down rebuilding and rehabilitation processes (New Zealand).

2. Presenting a conceptual typology of political economy and ecology

In this section, we (briefly) synthesize from four separate disciplines—political economy, political ecology, justice theory, and critical development studies—to lay the groundwork for our political economy typology based on enclosure, exclusion, encroachment, and entrenchment. [Table 1](#) offers a high-level summary of these four disciplines.

In its broadest sense, the term political economy deals with how government, or the “state,” interacts with the private sector, or “the market” ([Gilpin 1987](#)). As [Van de Graaf et al. \(2016: 4\)](#) put it succinctly, political economy examines “the relationship between politics and economics, between states and markets.” Part of this involves the area of inquiry here, notably material provisioning, or how the political-economic system distributes material (and even immaterial) costs and benefits ([Caporaso and Levine, 1992](#)). Political economy therefore involves the study of struggle, or the processes by which some actors benefit from particular systems or processes at the exclusion of others ([Wolff and Resnik, 1987](#)).

The closely related field of political ecology, in its broadest sense, also focuses on the influence of power relations and structural inequalities, but with a closer link to human processes which degrade the natural environment ([Wolff, 1972](#)). [Bryant and Bailey](#)

Table 1
Conceptual overview of related themes and disciplines.

	Political economy	Political ecology	Social Justice	Critical Development Studies
Primary focus	States and markets, conflict over natural resources, winners and losers	Power regimes, processes, or ideologies that enclosure upon resources or exclude agents from access	Fairness and equity in decision-making practices	Patterns of inequality in global economic development and growth
Related academic disciplines	Resource economics, geopolitics, political geography, political science, economic geography	Human geography, ecology, political geography, sociology, peasant studies	Environmental sociology, law, jurisprudence, philosophy, ethics, energy policy	Development studies, development economics, political geography, political science, international political economy
Key concepts or terms	Resource curse, intrastate conflict, interstate war	Human rights, externalities, accumulation by dispossession, new imperialism, peripheralization, resistance	Procedural justice, distributive justice, cosmopolitan justice, justice as recognition	Core and periphery, development discourse, appropriate technology
Selected authors	Michael Watts, Richard Auty, Terry Lynn Karl, Vaclav Smil, Michael L. Ross	David Harvey, Paul Robbins, Bill Cooke, Uma Kothari, Andy Blowers, Pieter Leroy, Noel Castree, James McCarthy	Karen Bickerstaff, Gordon Walker, Harriet Bulkeley, Benjamin Sovacool, Raphael Heffron, Darren McCauley, Kirsten Jenkins	Jeffrey Sachs, U. Kothari, Arturo Escobar, James Ferguson, James C. Scott, EF Schumacher

(1997: 28–29) and Watts (2016) write that political ecologists generally emphasize how the benefits and burdens of environmental change, or access to resources, are distributed across actors inequitably, which can serve to reinforce elitism or reduce social and economic equality. As such, Robbins (2004: 20) adds that political ecology research “tends to reveal winners and losers, hidden costs, and the differential power that produces social and environmental outcomes.”

Another relevant, related domain of inquiry is often termed with various prefixes to justice: social, environmental, climate, or energy “justice.” Social justice refers to equal or equitable distribution of wealth and opportunities in a given society. Environmental justice is concerned with the distribution of environmental hazards and access to natural resources; it includes equal protection from burdens, meaningful involvement in decisions, and fair treatment in access to the benefits (Low and Gleeson, 1998; Schlosberg, 1999; Byrne et al., 2002; Bowen and Wells, 2002; Walker, 2012). Climate and energy justice are closely linked, and refer to the fairness, virtue, or equity dimensions of actions and decisions concerning greenhouse gases and energy production and use (Arnold, 2011; Sovacool and Dworkin, 2014; Sovacool, Sidortsov, & Jones, 2014; Sovacool et al., 2016).

A final supporting school of thought comes from critical development studies or theory. Though vast, this type of scholarship generally critiques the global process of economic development. These theorists argue that “development” has only enabled advanced capitalist states, and recently major emerging economies, to define, know, and “meet” the needs of the “underdeveloped,” essentially establishing a hierarchy of societies and cultures (Escobar, 1995). Under this view, development agencies have maintained a largely technocratic approach to intervention and assistance, relying on centrally conceived projects run by development experts accountable to narrowly defined, quantitative indicators (Scott, 1998). A core conclusion in critical development studies is that such approaches need to be countered by participatory (Nelson and Wright, 1995; Schneider et al., 1995) or reflexive modes of development practice (Pieterse, 2001), which place a greater emphasis on local knowledge, and uncover the political nature of development activities (Ferguson, 1994).

The considerable similarity between these four domains of inquiry convinced us that their tenets can be partially synthesized. So far, the framework has been applied to climate change adaptation (Sovacool et al., 2015; Sovacool and Linnér, 2015; Sovacool et al., 2017; Sovacool, 2018) but not other sectors such as climate change mitigation or DR. Here, we argue when applied to DR efforts, the framework emphasizes three concerns:

- Costs, or how the hazards and externalities of DR can be imposed on communities unequally, often the poor, disempowered, or marginalized;

- Benefits, or how access to a particular form of DR might be biased or unevenly distributed;
- Procedures, or how DR efforts might proceed with exclusionary forms of decision-making rules and procedures that lack due process for involvement and representation of vulnerable stakeholders.

With an appreciation for looking at how the costs, benefits, and procedures of DR might play out on the international stage, we propose the following four processes summarized by Table 2.

Enclosure refers to when a DR project transfers a public or social asset into private hands, or expands the role and authority of a private actor into a formerly public sphere. It relates in part to how private institutions, especially corporate actors, intensify their efforts to penetrate into more remote or peripheral areas from which they can derive revenue (McCarthy, 2009). It can involve the incorporation of DR into what Hoogvelt (1987: 3) calls the act of “territorial accumulation” and the “continuous self-expansion of capital within the global system.” In this way, DR can expand the reach of capital as it “stretches” the reach of the market to encompass remote areas, and “deepens” capitalism by allowing it to penetrate into the provision of yet more goods and services (Prudham et al., 2009). In short, DR projects become “enclosed” as part of the strategy of capitalist accumulation (Harvey, 2003). Enclosure can occur with physical resources such as money or land, or it can relate to immaterial resources such as power and sovereignty.

Exclusion often occurs in tandem with enclosure (Heynen and Robbins, 2007), and it refers to when a DR project excludes or displaces a particular group of stakeholders or limits access to resources related to due process, fairness, and procedural justice. The process of exclusion enables resources to be appropriated or consolidated by state authorities, private firms, or social elites (Robbins, 2004). In many cases, relevant community based organizations or individuals are excluded from the decision-making process via the process of containment, a way to prevent and manage other actors from interfering with one’s interests (Few, Brown, & Tompkins, 2007). “Exclusion” is close to the notions of “dispossession” and “accumulation by dispossession” affiliated with capitalism, or that of “tyranny” affiliated with unfair decision-making processes (Harvey, 2003; Harvey, 2006). Cooke and Kothari (2001) frame their investigation of exclusion with the language of “tyranny,” arguing that decision-making processes themselves can become tyrannical and exclusionary. One way this exclusion can occur is when multilateral or international agencies and funders dominate discussions and decision-making about DR.

Encroachment refers to when DR projects degrade the environment, interfere with ecosystem services provision, or intrude upon biodiversity conservation zones such as protected areas and national parks. Though research on how the process of biodiversity

Table 2

Summary of the processes and sub-processes of enclosure, exclusion, encroachment, and entrenchment.

Dimension	Process	Description	Sub-processes	Sub-disciplines
Economic	Enclosure	Capturing resources or authority	Territorial accumulation, privatization, market stretching, parallel bureaucratization, land grabbing	Political geography, environmental geography, public policy, public administration, neo-Marxism
Political	Exclusion	Marginalizing stakeholders	Dispossession, accumulation by dispossession, tyranny	Political ecology, climate policy, development studies
Ecological	Encroachment	Damaging the environment	Commodification, subordination, forum shopping	Ecology, environmental science, biodiversity conservation, consumption studies
Social	Entrenchment	Worsening social inequality	Comparative advantage, elite capture	Welfare economics, environmental justice, gender studies, political economy

Source: Authors.

conservation itself can encroach upon indigenous lands or promote capitalist agendas is well documented (Bryant, 1998; Brockington and Igoe, 2006; Igoe, Neves, & Brockington, 2010; Peluso and Lund, 2011); less attention has focused on how hegemonic DR projects can encroach upon ecosystems or create their own type of environmental degradation. DR can, because it is primarily concerned with building human resilience, undermine the conservation of biodiversity (Turner et al., 2010). Reconstruction efforts can involve sand and gravel extraction from river channels and the rapid siting of new housing without regard to environmental sensitivity. In other situations, DR efforts can take advantage of property destruction to redistrict or redesign urban areas in elites' favor (Sovacool, 2017). DR efforts can also sometimes lead to increased greenhouse gas emissions—encroaching upon (reducing the efficacy of) efforts to mitigate carbon dioxide. For instance, relocating critical infrastructure outside of floodplains can enhance resilience but requires increased emissions due to the rebuilding of structures; it also likely increases sprawl and associated emissions from transport.

Entrenchment refers to when a DR project aggravates the disempowerment of women or minorities. It “entrenches” inequality by interfering with egalitarian systems of distribution or procedural justice, or by further concentrating wealth within a community or transferring risk. Economic entrenchment can occur when it is typically wealthier households that possess the requisite assets to maintain resilience in the face of a disaster—or in extreme situations—take advantage of vulnerable groups. It is these more powerful actors that can utilize cash or other productive assets to rebuild, rent buildings, purchase equipment, diversify livelihood opportunities or retrieve information that they can utilize to broaden and extend their influence. Poorer actors, by contrast, cannot generally afford to undertake these activities (Little et al., 2001; Holling, Gunderson, & Ludwig, 2002). Entrenchment, in other words, masks and maintains, and at times worsens, existing power relationships within or between households and communities (Christens and Speer, 1996).

3. Research method: Comparative qualitative case studies

To collect data for our study and conduct our analysis, we followed a comparative case study approach. We focused our inquiry around four different case studies using a DR project, or suite of projects and practices, as our unit of analysis. As Table 3 reveals, these four cases involved different types of disasters and sociotechnical systems, time periods, regulatory regimes, and sectors. We selected the United States because it is home to the world's largest economy and yet it still faced serious issues in recovering from a severe hurricane. We selected Thailand due to the scale and extent of the 2004 Boxing Day tsunami, impacts felt well beyond its borders due to the death of international tourists. We selected the Philippines as one of the more recent disasters with the highly impoverished Visaya region affected. We selected New Zealand because it has recently experienced a sequence of earthquakes resulting in significant loss of life, properties and infrastructure.

Each case study proceeds according to the same five-paragraph structure (we had to keep them brief for obvious reasons of fitting them into a single article). Each case begins with a summary of the DR project, and then dedicates one paragraph each to enclosure, exclusion, encroachment, and entrenchment.

4. Hurricane Katrina reconstruction in the United States (2005–2008)

On the morning of August 29, 2005, Hurricane Katrina made landfall in the United States, hitting the coast of Louisiana with

wind speeds of 125 miles per hour near Buras-Triumph. It was not the strongest of storms in terms of wind speeds, central pressures, or intensity—it was only a Category 3 hurricane—but its particular location along the Gulf Coast, and its abundant amount of rainfall and storm surge made it “the most devastating and costly hurricane in U.S. history” at that time (Cutter et al., 2006). At least 1,800 people died in the hurricane (one of them shown in Fig. 1) and its subsequent floods, and total cleanup and repair costs have been estimated at \$80–\$400 billion (Atkins and Moy, 2005; Lowe and Shaw, 2009). Although the storm's wrath was even felt from central Florida to Southern Texas, most of the damage occurred in New Orleans, Louisiana, after its levee system failed and about 80 percent of the city was flooded with stagnant water for many weeks (Bergal et al., 2007). That catastrophe was so stark that one expert has called it “the worst civil engineering disaster” in American history (Seed, 2007). More than 110,000 of 180,000 homes in New Orleans were flooded, and half sat for days or even weeks in more than six feet of water. After Katrina, 350,000 automobiles had to be drained of oil and gasoline and then “recycled,” in addition to 60,000 boats, 300,000 underground fuel tanks, and 42,000 tons of hazardous waste (Bullard and Wright, 2009). Katrina displaced at least 1.5 million people and saw a similar number of disaster relief applications—the largest ever recorded—leading to “one of the largest disaster diasporas” in the history of the country (Bullard and Wright, 2009). As Elliot and Pais argued (2006: 302), at that time there were “no precedents for this degree of sudden devastation and outmigration from a major urban region.”

Hurricane Katrina recovery exemplified different yet interconnected types of *enclosure*: expanded corporate control and profiteering over previously public services; the capture of public housing by private actors; and the takeover of public schools (Bullard and Wright, 2009). Millions of homes owned or occupied by evacuees were declared a nuisance and marked for demolition so that they could resold at cutthroat rates (Inniss, 2007). Moreover, before the hurricane, schooling in New Orleans was primarily public. However, the storm charter schools acquired rent-free buildings, strategically purchased public school buildings deemed a nuisance, and took advantage of falling property prices (Wright and Bullard, 2009). Seen in this light, private actors used Katrina recovery efforts to reshape the city around their narrow goals.

Katrina recovery perpetuated or created forms of *exclusion* as well, especially for the free movement of people across the city, access to reconstruction jobs, and planning discussions. Evacuees for instance were physically excluded from wealthier parts of New Orleans. On September 1, 2005, three days after Katrina made landfall, thousands of evacuees reportedly fleeing the Convention Center marched towards a bridge that would take them to safety, only to be turned back by police and sheriffs from Gretna, a predominately white, middleclass neighborhood (Henkel, Dovidio, & Gaertner, 2006). Another form of exclusion relates to contracts and jobs for reconstruction. Oddly, here, builders took advantage of undocumented (illegal) workers willing to accept extremely low wages, sidelining those seeking competitive wages (Bullard and Wright, 2009). Also, volunteers and front-line disaster workers, especially women and minorities, were “excluded from the processes of developing and setting priorities for the recovery” and “became discouraged and fatigued at not being heard” (Weber and Messias, 2012).

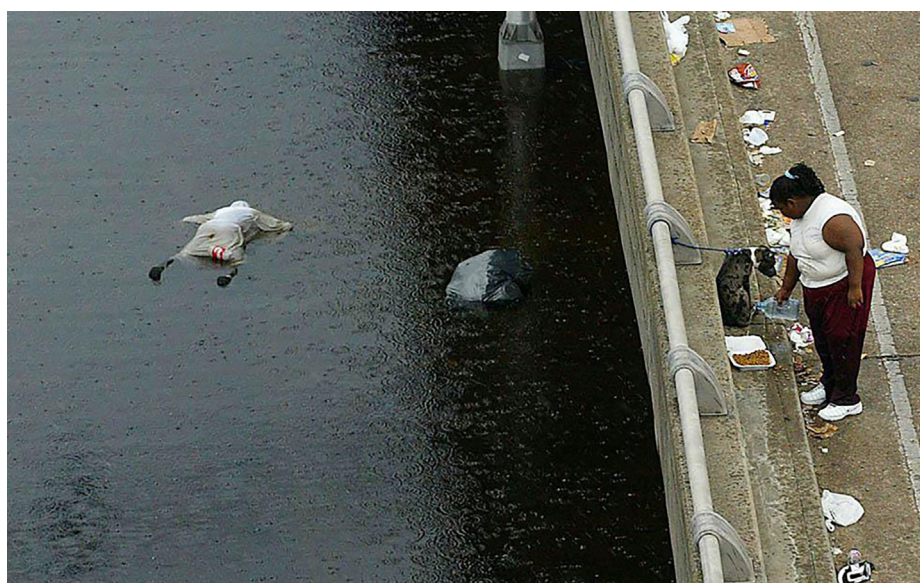
The *encroachment* effects of Hurricane Katrina recovery involve a relaxation of environmental standards, environmental perturbations concerning infrastructure repair and dredging, and a concentration of toxic pollution and debris among some communities. To expedite emergency repairs to levees and, at a later stage, infrastructural rehabilitation work, local, state, and national environmental standards were curtailed following Katrina (Olson, 2005). For example, federal requirements concerning the disposal of con-

Table 3

Summary of four political economy of DR case studies.

Case study	Time period	Country	Type of economy	Disaster risk	Form(s) of recovery
Hurricane Katrina reconstruction	2005–2008	United States	High income	Hurricane	Flood levees, emergency assistance, insurance, dredging
Boxing Day Tsunami	2004–2007	Thailand	Middle income	Tsunami	Global aid assistance, major rebuilding of hotels and tourist infrastructure, flood defenses, targeted subsidies for fishing
Typhoon Yolanda	2013–current	Philippines	Lower-middle income	Typhoon	Global aid assistance, major reconstruction and rebuilding, seawalls and tidal embankments, fisheries restoration, micro-finance schemes
Canterbury Earthquakes	2010–2011	New Zealand	High income	Earthquakes	Recovery and rebuilding, revitalization of the Central Business District, insurance, strengthening of building codes

Source: Authors.

**Fig. 1.** A Bloated Body in the Floodwaters near the New Orleans Superdome, United States, September 2005. Source: U.S. National Guard.

struction and demolition materials were relaxed, so hazardous wastes intermingled with ordinary items being sent to landfills without protective liners (Moe, 2010). In another case, state officials relaxed open burning bans to enable the burning of debris in open pits without air pollution controls (Mitsch, 2014). Infrastructure repair and rehabilitation efforts following the storm were so comprehensive, and focused on enhancing human safety, that they often damaged the environment through the use of heavy equipment, dispersal of rock and sand, and dredging (DesRoches, 2012; Poe, 2005). A final encroachment effect related to the concentration of pollution, notably from debris and removal of hazardous materials, in certain communities. Cleanup efforts concentrated much of this pollution in particular landfills or alongside minority neighborhoods (Harden et al., 2007). Furthermore, sediment in the wake of floodwaters left many schools in minority areas with drinking water contaminated with levels of arsenic in excess of federal standards (U.S. Environmental Protection Agency, 2006).

Entrenchment—aggravating the disempowerment of women or minorities and/or worsening asymmetrical concentrations of wealth—is our final factor at play in Katrina. Racial bias has been confirmed in impacts of the storm and property flooded, with African Americans and other minorities occupying more low-lying land and/or land poorly protected by infrastructure (Driesen et al., 2005). Access to transportation and the ability to evacuate had a racial bias, with roughly one in ten African Americans

initially evacuated compared to almost nine out of ten Caucasians (Masozera, Bailey, & Kerchner, 2007). Persons forcibly displaced and/or forced into living in temporary shelters had a racial bias: African Americans sometimes lived in cardboard boxes labeled “Katrina ghettos” while white families lived in hotel rooms or on cruise ships (Bullard and Wright, 2009). Racial bias was also confirmed in effectiveness in finding new housing—in the disaster area, and across the country—after the storm (white families were reportedly favored two to one by housing companies) (National Fair Housing Alliance, 2005) as well as in the ability to return to New Orleans and the Gulf (Fussell, Sastry, & VanLandingham, 2010). Indeed, 47 percent of African Americans were unable to return to New Orleans compared to only 19 percent of white households (Bullard and Wright, 2009). There were also multiple reported incidents of female rescue workers being sexually assaulted and raped, but virtually no cases of men facing the same threats (Luft, 2008).

5. Tsunami recovery in Thailand (2004–2006)

On the morning of the 26th December 2004, a magnitude 9.3 submarine earthquake occurred in the Indian Ocean, 160 km west of Sumatra. The earthquake deformed the ocean floor and generated a tsunami which caused one of the greatest natural disasters of the last century. Around 300,000 people died in an arc of devastation from Indonesia through Malaysia, Thailand, India, Sri Lanka



Fig. 2. The stranded *Blue Angel* in Ban Naem Khem Khao Lak Thailand. Source: Authors.

and East Africa. Large areas of coastal southern Thailand – as well as Indonesia, Sri Lanka and India – were transformed when the tsunami swept ashore. Fig. 2 shows one fishing boat thrown more than a kilometer from the seashore. Officially, there were 5395 confirmed deaths in Thailand, with a further 2932 people listed as missing. Most of the deaths were concentrated in the provinces of Phang-nga and Krabi, with smaller numbers of fatalities in Phuket, Ranong, Satun and Trang. The outcomes of recovery trajectories in Thailand have both positive and negative impacts on people and the environment (Tan-Mullins, Rigg, & Grundy-Warr, 2007).

The *enclosure* facilitated by tsunami recovery efforts was both physical and procedural. Small scale tourism operators claimed that the government under Prime Minister Thaksin Shinawatra was using the disaster to gain access to some of the best tourist development land through evacuating pre-tsunami operators in the interests of the environment and disaster mitigation under the Designated Area for Sustainable Tourism Administration plan or Dasta (Charoenpo, 2005). After the tsunami, the government, enclosed areas as “no-build zones” (Suppasri et al., 2015), and put in place a policy of providing free housing and title deeds in inland locations to tsunami-affected fisher folks. The policy was rejected by many local communities and civil society as inappropriate as from a livelihood perspective, it was impossible for fishers to travel tens of miles daily to fish. This was made even more difficult by the fact that citizenship identification papers, ownership documentation (of land and property) and insurance policies were washed away by the tsunami. Without such documentation it was hard, sometimes impossible, for victims to secure employment, access health care, and receive aid assistance, even inheritances from deceased family members (East-West Center, 2005).

In terms of *exclusion*, tight procedural deadlines for submission of documents for compensation ended up excluding many small scale fishers from receiving donor aid. For example, boat owners in Thailand had to register within 15 days the loss of their vessels. The Provincial Fisheries Office (or District Fisheries Office) had to then collate the documents and check their accuracy before sending them to the Department of Fisheries within 120 days (Funge-Smith, 2006). In some places, fishers missed the deadline and,

therefore, were excluded from the compensation process. However, the most obvious excluded group of stakeholders were Burmese migrant workers, particularly those who were working illegally in Thailand. According to Keys, Masterman-Smith, and Cottle (2006), the Thai government used the tsunami as an opportunity to deport undocumented Burmese immigrants. Following the tsunami, at least 2000 Burmese were rounded up, detained and then deported.

In terms of *encroachment*, the abundant supply of new fishing boats disbursed by various donors (private and public) had the effect of depleting fish stocks. “Prior to the tsunami, villagers fished on a self-sufficiency basis,” said Adul, deputy secretary of the Federation of Southern Small-scale Fishermen (FSSF), a network of fishing communities in 13 provinces on the Andaman Sea. “But now they have new boats and gear, and many want to catch more fish” (Tan-Mullins et al., 2007: 125). This negative impact on the environment occurred during the rebuilding process as a misuse of the generosity of the public, due to lack of aid coordination and disbursement.

In terms of *entrenchment*, official aid disbursements followed patterns of discrimination linked to ethnicity, religion, class, and gender (East-West Center, 2005). Buddhists for example received an abundance of aid due to larger donations and a better religious network. There were also reported cases of aid being given out for the purposes of trying to convert Muslims into Christians, stating attendance at masses as one of the conditions to receive aid (Burke, 2005). These factors could explain why the Asian Development Bank projected that the tsunami placed more two million people into chronic poverty across Indonesia, India, Sri Lanka, the Maldives and Thailand, one million of which would remain in poverty after recovery efforts (Hagiwara and Sugiyarto, 2005).

6. Typhoon Yolanda rebuilding in the Philippines (2013–current)

On 8 November 2013, super-typhoon Yolanda (international name Haiyan) hit the Visayas region of the Philippines (see

Fig. 3). Yolanda was one of the strongest typhoons ever to make landfall. Wind speeds reached 315 km per hour and a storm surge reached six meters in some places (Lagmay, 2014). Official figures indicate that 6293 individuals were reported dead; most perished by mass drowning (Yi et al., 2015). In addition, 1061 went missing, 28,689 were injured, and 4.1 million people were internally displaced and more than 14 million people affected (Lum et al., 2014). The typhoon impacted 591 municipalities and total damage is estimated at almost \$1 billion; more than 1.1 million houses were damaged, and 500,000 completely destroyed (Yamada and Galat, 2014). The Philippine Foreign Aid Transparency Hub (Foreign Aid Transparency Hub, 2016) reports that almost \$400 million have been channeled into international calamity and aid assistance programs, signifying a significant international relief effort. However, poverty and livelihood concerns in the Eastern Visayas has increased substantially since the typhoon and the rebuilding of sustainable communities in the longer term is an ongoing concern.

In aid distribution throughout the Philippines, *enclosure* occurred as the aid disbursement process shifted from the national government and aid organizations to private individuals such as barangay captains (village headman). Barangay captains were heavily involved in compiling lists of residents that qualified for aid. Some residents reported that those who were perceived to oppose the barangay captain politically were excluded from the lists (Eadie et al., 2017). This meant that many were formally disqualified from aid. Other residents also complained that barangay captains and even municipal officers skimmed off the best goods (imported goods were regarded as premium) for themselves. Furthermore, Oxfam (2014: 3) documented that typhoon recovery

provided “opportunities for land speculation and land grabs as a result of population displacement.”

Exclusion occurred as well. Before the typhoon, in places such as the provincial capital of Leyte, Tacloban, about one-third of the population were squatters residing on the disaster-prone coastline (Yamada and Galat, 2014). Shortly after Yolanda a verbal directive from President Aquino ordered that no houses were to be built in a zone reaching 40 m from the sea. A corresponding Department of Environment and Natural Resources directive was subsequently brought into law in March 2014 as House Resolution No. 947. People in Yolanda-affected areas who lost their houses in the no dwell zone were excluded from receiving Department of Social Welfare and Development funded Emergency Shelter Assistance. Civil society groups, notably domestic and international nongovernmental organizations, were also restricted from assisting rebuilding in these zones. However, the construction of permanent, or even transitional housing, has been painfully slow (Magtulis, 2016; Cruz et al., 2016). Oxfam (2014) estimated that as many as 200,000 people were specifically at risk of eviction via government proposals to build safer communities. Finally, after the typhoon, Philippines' Environment Secretary began a program of mangrove replanting and rehabilitation to provide a buffer against future storms, efforts that excluded people from living in those forested areas (Long, Giri, Primavera, & Trivedi, 2016).

Duplicated aid and an emphasis on fisheries also perpetuated *encroachment*. Some villages reported a 50 percent increase in the number of boats, however this corresponded with negative impacts on the sustainability of fisheries. Another example is the Tacloban Embankment Project. A year after typhoon Yolanda, the local government, together with support from the Japanese government and the Japan International Cooperation Agency, proposed to build a seawall along the Tacloban-Palo-Tanuan seafont. The Department of Public Works and Highway says the 7.9 billion peso (US \$155 million) road heightening and tide embankment project promises to protect Yolanda-effected areas in these three municipals from future calamities such as storm surge. The overall conceptual plan is to build a 27.3 km tidal embankment with a height of around 4.5 m. Local fishers and environmental groups have spoken out against the “great wall of Leyte” (UNTV, 2016). This is because the seawall will remove the livelihood options of the current fishers, and will also alter the ecosystem and ecology in the coastal area and affect the ecosystem's services provided by the coastal sea.

The process of rebuilding also facilitated *entrenchment*. As one of the rebuilding strategies, different official and unofficial micro-finance schemes were established to focus on lending smaller amounts of money to women. Such projects can be beneficial financially and build skills and capacity. However, some of these benefits were offset by rogue financing schemes and exploitative lenders who further placed their marginalised customers in a disadvantaged position by charging large amounts of interest or by withholding their cash cards and holding them in financial bondage. There was a gender and rural bias to the aid disbursement as well; even though the largest agricultural sector directly damaged by the typhoon was coconut farming, such rural enterprises received few resources; and even though women were the most affected class of victims, they received fewer funding than men, especially fishermen. Oxfam (2014) for instance documented that “women face[d] particular risks of exclusion or marginalization.” Given the exclusion noted above, Oxfam (2014) suggests that the Build Back Better program has only perpetuated a cycle of land tenure “insecurity” among the landless, with displaced persons more likely after the typhoon to lack a rightful claim to land, to fall into poverty, to lack permanent housing, and/or to move back to unsafe land.

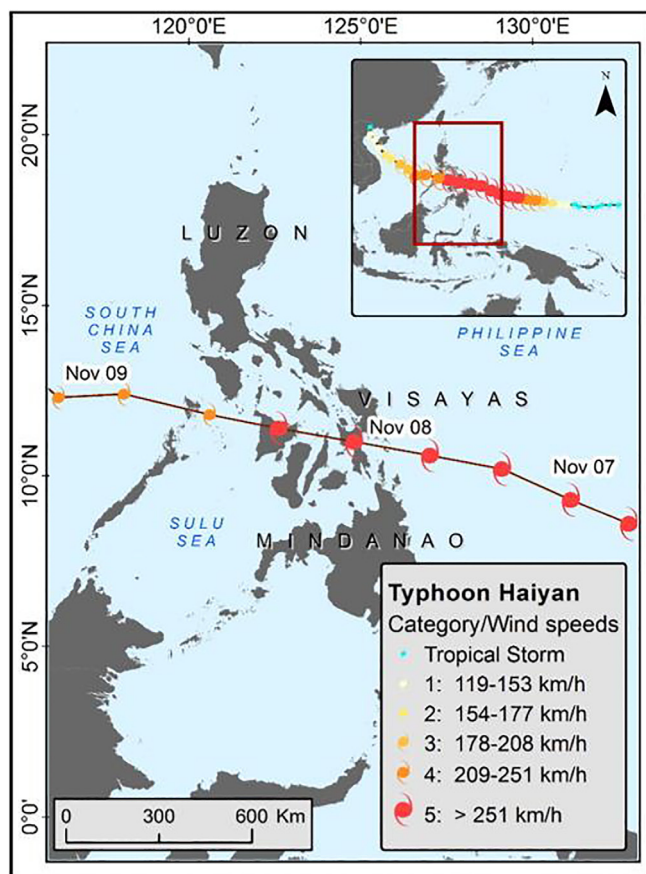


Fig. 3. Path of Typhoon Haiyan in the Philippines. Source: Long et al.

7. The Canterbury earthquakes recovery in New Zealand (2010–2017)

On September 4, 2010, a magnitude 7.1 earthquake struck Darfield (about 40 km west of Christchurch, Canterbury) at a depth of 11 km, and five months later, on February 22, 2011, Christchurch (a city of about 370,000 inhabitants at the time) was struck by a 6.3 magnitude aftershock at a depth only 5 km – the latter resulting in 185 fatalities. The Canterbury earthquake sequence included more than 10,000 tremors, 400 of these were greater than magnitude 4 and 40 greater than magnitude 5 (Wilson, 2013). The quake sequence, shown in Fig. 4 (Morgan et al., 2015), resulted in the largest damage in Aotearoa New Zealand's history since European settlement (Stevenson et al., 2011). The severe ground motions caused the collapse of many commercial, industrial and residential buildings in Christchurch's Central Business District (CBD) and liquefaction of the surface soils over a large region resulted in extensive damage to infrastructure (Potter et al., 2011). About 100,000 homes (half the housing stock) were damaged, a further 7000 were so badly damaged they were deemed uninhabitable, and 3000 of the 5000 businesses in the CBD were displaced (Paton et al., 2014). Essentially, the earthquake crippled the CBD with many major parts of the city closed to the public for more than two years after (Brown, et al., 2010). Furthermore, Canterbury earthquake response and recovery is among the most costly to date, estimated at \$40 billion (Wood, Noy, & Parker, 2016). The rebuild of Christchurch has been characterized as “slow,” with a local newspaper noting that 2017—years after the quake—may be the year that Christchurch finally moves from “a city in recovery to a city in rebuild” (The Press, 2016).

The process of *enclosure* in response to the Canterbury earthquake sequence can be characterized by various activities. One is the centralization of power within the national government. The

Canterbury Earthquake Recovery Agency (CERA) was established as a government department following the February earthquake to coordinate the Government's response. The Canterbury Earthquake Recovery Bill endowed CERA and the Earthquake Recovery Minister with the executive power to stipulate legislation without the agreement of Parliament. For example, CERA could suspend or extend laws and regulations. It could acquire, hold and dispose of property, and the Minister was able to fast-track planning processes. This presented the potential for “unilateral decision making in the name of economic necessity” (Tudor, 2013: 22). Hopkins (2011) warned “that these decisions [about Christchurch] will be left to a minister with huge, unchallengeable legal powers, monitored only by a panel of ‘experts’ of his own choosing.” As Gibson et al. (2016: 14) add, “All the key pieces of legislation in the natural hazard risk management framework are under review or have had reforms introduced to strengthen the national government's role, standardize and streamline policies, curb perceived bureaucracy and shorten decision making processes. There are strong concerns about the retreat from decentralized and collaborative governance approaches and the potential lasting implications for local government and representative democracy.” It also marks significant departure from established New Zealand norms of deliberate and more democratic forms of governance, with Mamula-Seadon and McLean (2015: 90–91) noting the earthquakes “transformed significantly” governance structures with “top-heavy” management and that CERA was not “well equipped” in dealing with community planning and citizen empowerment. This centralized government response posed a number of issues for effective and efficient response and recovery management, and it also eroded authority held previously by locally organized groups.

Exclusion was apparent as well. The centralized top-down approach to recovery and rebuild has been described by local media as “bureaucratic, militaristic and the opposite of the

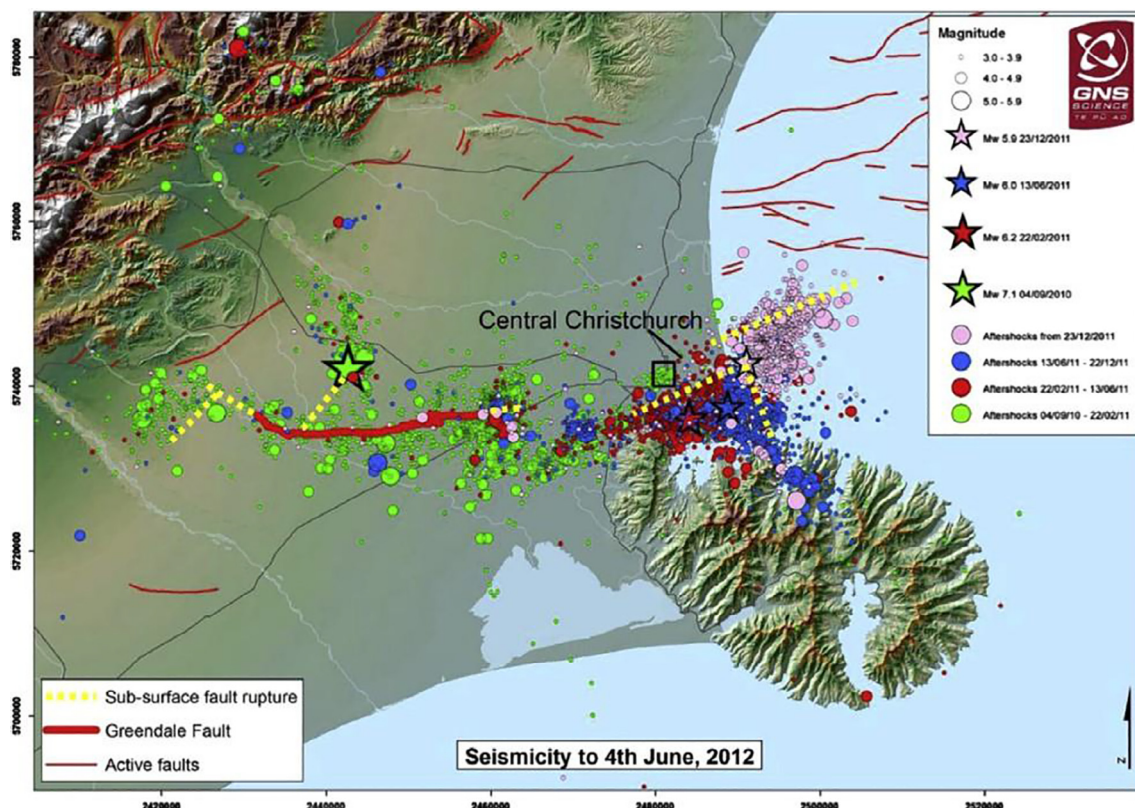


Fig. 4. The Canterbury earthquake sequence from 4th September 2010 to 4th June 2012. Source: Morgan et al. (2015)

community-led approach Christchurch needs” (Stuff, 2011). It has resulted in exclusion of groups of people from decision-making on a number of levels and even an abdication of responsibility from local actors (Mamula-Seadon and McLean, 2015). Christchurch for instance experienced the “loss of an effective or meaningful democratic voice at local government level” (Hayward, 2012: 37). Some suggested that the Government used the earthquakes as a justification to postpone regional government elections. This meant that regional and local councils were excluded from making decisions about their own resource use. The establishment of CERA further marginalized the role of locally elected urban authorities in the recovery and excluded them from making decisions about locally-relevant issues. Local residents were also excluded from decision-making processes around the status of their homes and in some cases excluded from having a voice in decisions about the rebuild of the city. For example, homeowners faced issues accessing insurance cover for repairing and rebuilding homes, and many homeowners were (and still are) locked in disputes with insurers. In 2017, six years after the devastating quake, it is estimated that nearly 3000 residential insurance claims relating to property damage remain unsettled (Insurance Council of New Zealand, 2017). The rights of residents to appeal decisions that directly affect them have been limited with residents generally having “little say” in what happens (The Press, 2017). Lastly, meaningful engagement and involvement of local indigenous Māori people has been minimal, with Gibson et al. (2016: 14) writing that “institutional resistance has prevented the inclusion of Māori and/or communitarian approaches within hierarchical emergency management practices which have encouraged both expert as well as individualized responses to natural hazard risks.” (To be fair, the experience with exclusion was not entirely negative—the earthquake did catalyze an important national debate about inclusion and equality in national disaster policy, as well as the need for new approaches to political deliberation and governance, see Cretney (2016) and Gibson et al. (2016) for more).

In terms of *encroachment*, the rebuild of Christchurch city has required extensive infrastructural repairs given the sheer damage caused by the earthquake, the many aftershocks, and unprecedented levels of liquefaction. Liquefaction occurs when soils below groundwater level temporarily behave like a liquid, as they lose strength and stiffness when they move during a quake (Potter, Becker, Johnston, & Rossiter, 2015). Repairing such infrastructure and addressing liquefaction, however, has involved a meaningful increase in carbon emissions. While there was a reduction in overall energy use immediately after the earthquakes, energy use is estimated to be 3.7 per cent higher than pre-quake levels, mainly as a result of a rise in diesel use from heavy demolition vehicles (Cockrem and Priest, 2013). Land use has also changed significantly in and around the periphery of the city, as a result of liquefaction. Businesses, shops and restaurants in the CBD experienced extensive damage and many moved to the outer suburbs of the city. Average trip distance has increased and public transport and active

travel have become less attractive modes of transport. The use of public transport use dropped 44% between 2010 and 2012 with the loss of 50,000 jobs in the central city and the central bus exchange (Cockrem and Priest, 2013). Sir Mark Solomon, the head of the local Māori iwi (tribe) Ngāi Tahu, noted that the rebuild has not put enough emphasis on sustainability: “It was certainly one of my visions that we would adopt full green technology across the city. But if you go through the subdivisions – including our own – it’s the same old, same old” (The Guardian, 2014).

Entrenchment occurred largely due to a market led recovery approach that did not appreciate vulnerability, especially for those on lower incomes or those who did not own property. About a third of residents in Christchurch are renters, and with large residential areas red-zoned and uninhabitable, reduced supply of housing meant that the cost of rental housing skyrocketed. As Sarah Richardson, Christchurch Methodist Mission chief executive remarks: “that market reality is a dozen people sharing a house, people camping in garages, people sleeping in cars For those at the bottom, those with the least control over their lives, we are seeing the least being done to sort their housing problems” (quoted in The Press, 2013). Instead, the focus appears to be on the rebuild of the CBD, with bars, cafes, shops, and a convention center, exacerbating social and economic inequalities. Moreover, roughly 20% of earthquake losses were not covered by insurance, and for the roughly 800,000 related insurance claims that did proceed (including residential and non-residential), the national insurance cover provided by the Earthquake Commission capped damages at NZ\$100,000 (Morgan et al., 2015). Consequently, Paton et al. (2015) argue that New Zealand earthquake recovery has not resulted in effective preparedness for future quakes, with only a small fraction of households (28%) having basic resilience measures (e.g., having food and water for at least three days) in place.

8. Policy implications and recommendations

Although the political economy processes of DR can at times distort or mold projects and processes to the interests of dominant stakeholders, that is *not* to say that they completely undermine or obfuscate all of the benefits of DR. Even the specific critiques we raise, some of them quite sobering, are aimed at a target: improving and learning so that the least vulnerable are helped, and so that benefits and burdens are made visible, and distributed fairly and according to representative processes. Practitioners of DR need to become more cognizant of the potential for projects to harm others, or admit complicity in the processes of enclosure, exclusion, encroachment, and entrenchment. In short, DR advocates must continually ask, “Recovery for whom?”

With this in mind, DR efforts need not always pose such a grave threat to vulnerable groups. As Table 4 summarizes, three policy mechanisms can do much to minimize and manage the political and economic dangers that can arise in recovery efforts.

Table 4

Policy mechanisms for more just and equitable disaster recovery.

Dimension	Mechanism	Explanation
Poverty and vulnerability	Insurance and liability	Create an insurance scheme that helps equitably socialize the risks of disasters so that sufficient resources are available to assist the poor and vulnerable
Exclusion and marginalization	Adhere to Free Prior Informed Consent	Maintain a robust consultative process whereby a potentially affected community engages in an open and informed dialogue with disaster recovery managers
Social and environmental damage	Implement punitive bonds	Environmental bonds would require disaster recovery sponsors to provide compensation that would be voided or forfeited when projects damage communities or the environment

Source: Authors.

Table 5
Summary of political economy of disaster recovery case studies.

Process	Case study	Explanation
Enclosure	Hurricane Katrina	Public recovery resources primarily benefitted large corporations (casinos, cruise line ships, port operators) and homeowners; private actors use recovery to facilitate their own housing development plans or the capture of public school buildings
	Boxing Day Tsunami	Government-linked private companies used no-build zone policies to seize prized beach front land for their own developments
	Typhoon Yolanda	Privatization of aid distribution reduced the effectiveness of aid, resettlement patterns threatened by land grabs
	Canterbury Earthquakes	Canterbury Earthquake Response and Recovery Act conferred unilateral power to the national government so that it could suspend laws, acquire, hold and dispose of property
Exclusion	Hurricane Katrina	Businesses employed low-wage undocumented workers in reconstruction work, excluding others; minority evacuees faced rent hikes or eviction; women and disaster front-line volunteers were excluded from planning discussions
	Boxing Day Tsunami	Marginalizing policies with tedious procedures for claims excluded certain groups from receiving aid and compensation
	Typhoon Yolanda	A 40 m 'no-build zone' excluded landless occupants from the rehousing process
	Canterbury Earthquakes	A centralized government approach interfered with decision-making processes of local officials and weakened the rights of homeowners in securing insurance claims
Encroachment	Hurricane Katrina	Reconstruction involved infrastructure repair and dredging done in conditions of relaxed environmental standards
	Boxing Day Tsunami	Lack of coordination between agencies resulted in more fishing boats given to communities and intensified fishing activities with depleted fishery resources
	Typhoon Yolanda	Embankments altered the ecology and ecosystem services provision of coastal areas
	Canterbury Earthquakes	Infrastructural repairs resulted in significant diesel emissions; rezoning of urban areas as a result of liquefaction resulted in longer commuting distances
Entrenchment	Hurricane Katrina	Poor, minority, female evacuees were less likely to have access to transport, more likely to face forcible resettlement or remain in temporary shelters; private developers used the disaster as an opportunity to promote their own agendas
	Boxing Day Tsunami	Non-Buddhist communities received less aid due to smaller networks; some donations were politicized and used convert followers
	Typhoon Yolanda	DR and rebuilding strategies focused on men; women were further marginalized with microfinance schemes; poverty and land tenure insecurity were worsened via recovery efforts
	Canterbury Earthquakes	Market led recovery approach increased the vulnerability of renters/tenants and the poor

Source: Authors.

The first is to ensure adequate accessibility to disaster relief for the vulnerable. This could be done through a global insurance and liability regime that addresses some of the causes behind more severe disasters, such as climate change, through a tax or financial compensatory mechanism (Spreng et al., 2016). Such a liability tax or insurance scheme would ensure that the cost of disaster relief following a hurricane must include not only physical reconstruction and rehabilitation, but also funding to defray the social impacts facing migratory refugees and sensitivity to environmental recovery and bioremediation. Or, that the cost of afforestation to minimize erosion must include money for planting trees as well as compensation for those forcibly relocated from the conservation area and retraining for farmers or fishers who have lost their jobs.

The second recommendation is to promote Free Prior Informed Consent (FPIC) so that no coercion, intimidation, or manipulation has occurred in the design or implementation of a disaster relief project (Aton and Shelton, 2011). It demands that consent has been sought sufficiently in advance of any meaningful decision to proceed; that information about the project is provided that covers its nature, size, pace, reversibility, and scope; and that agreement with proposed project measures exists. Although such FPIC would need to be obtained quickly—there is a justifiable sense of urgency and immediacy in DR objectives—it would help to counter disempowerment and elitism. Managers of recovery efforts could for instance be explicitly charged with identifying community and minority groups and seeking their input; moreover, assessments of the social and environmental impacts of recovery could be dynamic, and undertaken by panels charged to take complex existing disparities into account (Sovacool, 2017).

Thirdly, environmental bonds for disaster recovery would provide a contractual guarantee that the principal of the bond (a project manager, for instance) performs in an environmentally benign, and socially responsible, manner. Bonds would be levied for the current best estimate of the largest potential damages, but returned (with interest) if no harm is done (Sovacool and Linnér, 2015). This type of bonding may sound radical, but similar

approaches already exist in the domains of construction, mining, and nuclear power. The 1935 Miller Act in the United States requires that contractors performing construction for the federal government secure performance bonds, a contractual guarantee that the principal (the entity which is doing the work or providing the service) will perform in a designated way; the Surface Mining Control and Reclamation Act of 1977 stipulated the use of performance bonds to guarantee reclamation of mining sites for coal and other minerals; the Nuclear Regulatory Commission stipulates regulations similar to bonds for the decommissioning of nuclear facilities and the storage and disposal of nuclear waste (Cornwell and Costanza, 1999).

9. Conclusion

In sum, the political economy of DR, namely the processes of enclosure, exclusion, encroachment, and entrenchment, can distort the goals and effects of even the best intentioned efforts and practices. All four of our case studies exhibited all four of our political economy processes, which we summarize in Table 5. In the United States, Hurricane Katrina recovery efforts consolidated corporate control and facilitated profiteering over publicly available disaster relief aid, and enabled private actors to procure public housing projects and local schools; they also excluded many evacuees from motorized transportation and accommodation, and further degraded the natural environment via reconstruction efforts and dredging. In Thailand and Philippines, the “no-build zones” associated with recovery created new spaces of contestation in terms of ownership of land and property. Similarly, the politics of aid distribution in both countries saw efforts prioritize some sectors (notably fishing) with deleterious effects on fish stocks and the exclusion of others (coconut farming), and efforts marginalized certain classes and ethnic or religious groups in the DR process. In New Zealand, the Canterbury earthquakes enabled the central government to suspend Parliamentary checks and

balances, eroded local authority, deepened dependence on carbon-intensive forms of energy and rates of household poverty, and did not result in effective preparedness for future quakes.

What to do? We advocate three policy recommendations. One solution is for better insurance schemes and spread and socialize the risks (and costs) of disasters so they do not fall inequitably on the poor and helpless. One is to put vulnerable groups and fragile ecosystems front and center in the aftermath of disasters via improved procedures for Free Prior Informed Consent and an explicit mandate to recognize disparities. One is to design and trial environmental bonds that withhold compensation from projects that damage communities or the environment. The people most affected by disasters never choose to have them occur, but which policy mechanisms the DR community decides to adopt next could be critically important for their wellbeing.

Notwithstanding these suggestions, which are about policy, we must also be continually aware of politics, the underlying social, political, or economic forces behind policy interventions. That means recognizing that DR recovery in many ways is less about rationally optimizing pathways and more about politically managing tradeoffs: disasters can overwhelm local and national capacity but also put intense pressure to delivery recovery services. Immediacy must be balanced with precaution; familiarity balanced with creativity; cost-effectiveness balanced with sensitivity and specific needs balanced by equitable and holistic decision-making processes. The risk of natural disasters, politics of disaster recovery, ecological resilience of affected areas, and local practices of development are all intertwined (Gibson et al., 2016; Cretney, 2017). This reminds us that while disasters (and DR as policy and practice) may offer windows of opportunity, those windows are often tinted—shaded and darkened—by structural inequality and the political economy dynamics and power relations of actors.

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References

- Arnold, D. G. (Ed.). (2011). *The ethics of global climate change*. Cambridge, U.K.: Cambridge University Press.
- Atkins, D., & Moy, E. M. (2005). Left behind: The legacy of Hurricane Katrina: hurricane Katrina puts the health effects of poverty and race in plain view. *BMJ: British Medical Journal*, 331(7522), 916–918.
- Aton, D. K., & Shelton, D. L. (2011). *Environmental protection and human rights* (p. 431). New York, NY: Cambridge University Press.
- Bergal, J. (Ed.). (2007). *City adrift: New Orleans before and after Katrina*. Baton Rouge, Louisiana: Louisiana State University Press/Center for Public Integrity.
- Bowen, W. M., & Wells, M. V. (2002). The politics and reality of environmental justice. *Public Administration Review*, 62(6), 688–698.
- Brockington, D., & Igwe, J. (2006). Eviction for conservation: A global overview. *Conservation and Society*, 4(3), 424–470.
- Brown, C. et al. (2010). Factors influencing impacts on and recovery trends of organisations: evidence from the 2010/2011 Canterbury earthquakes. *International Journal of Disaster Risk Reduction*, 14, 56–72.
- Bryant, R. L., & Bailey, S. (1997). *Third world political ecology* (pp. 28–29). London, U. K.: Routledge.
- Bryant, R. L. (1998). Power, knowledge and political ecology in the third world: A review. *Progress in Physical Geography*, 22, 79–94.
- Bullard, R. D., & Wright, B. (Eds.). (2009). *Race, place, and environmental justice after Hurricane Katrina: Struggles to reclaim, rebuild, and revitalize New Orleans and the Gulf Coast* (pp. xix–xxii). Philadelphia, PA: Westview Press.
- Burke, J. (2005). Religious aid groups try to convert victims. *The Guardian*, January 16 available at <https://www.theguardian.com/world/2005/jan/16/tsunami2004.internationalaidanddevelopment1>.
- Byrne, J. (Ed.). (2002). *Environmental justice: Discourses in the international political economy*. New Brunswick, New Jersey: Transaction Publishers.
- Caporaso, J. A., & Levine, D. P. (1992). *Theories of political economy*. Cambridge, U.K.: Cambridge University Press.
- Charoenpo, A. (2005) Phi Phi businesses feared ‘hidden agenda’, Islanders threatened to ignore rebuilding ban. *Bangkok Post*. Retrieved 20 December 2005 from http://www.bangkokpost.com/News/20Dec2005_news14.php.
- Christens, B., & Speer, P. W. (1996). Tyranny/transformation: Power and paradox in participatory development. *Qualitative Social Research*, 7(2), 1–10.
- Cockrem, P., & Priest, C. (2013). Rebuilding a zero carbon Christchurch. Available at: http://www.generationzero.org/rebuilding_a_zero_carbon_christchurch Accessed on July 10, 2017.
- Cooke, B., & Kothari, U. (2001). *Participation: The new tyranny?* New York, NY: Zed Books.
- Cornwell, L., & Costanza, R. (1999). Environmental bonds: Implementing the precautionary principle in environmental policy. In C. Raffensperger & J. A. Tickner (Eds.), *Protecting public health and the environment: Implementing the precautionary principle* (pp. 220–240). Washington, DC: Island Press.
- Cretney, R. M. (2016). Local responses to disaster: The value of community led post disaster response action in a resilience framework. *Disaster Prevention and Management*, 25(1), 27–40.
- Cretney, R. M. (2017). Towards a critical geography of disaster recovery politics: Perspectives on crisis and hope. *Geography Compass*, 11(1), e12302.
- Cruz, M., & Reyes, R.O. (2016) Yolanda rehab fund audit pressed. *The Manila Standard*, 8 November. Retrieved from <http://thestandard.com.ph/news/-main-stories/top-stories/220874/yolanda-rehab-fund-audit-pressed.html>. (Accessed 15 November 2016).
- Cutter, Susan L., Ash, Kevin D., & Emrich, Christopher T. (November 2014). The geographies of community disaster resilience. *Global Environmental Change*, 29, 65–77.
- Cutter, S. L., Emrich, C. T., Mitchell, J. T., Boruff, B. J., Gall, M., Schmidtlein, M. C., et al. (2006). The long road home: Race, class, and recovery from Hurricane Katrina. *Environment*, 48(2), 8–20.
- D’Alisa, Giacomo, & Kallis, Giorgos (May 2016). A political ecology of maladaptation: Insights from a Gramscian theory of the State. *Global Environmental Change*, 38, 230–242.
- DesRoches, R. (Ed.). (2012). *Hurricane Katrina: Performance of transportation systems*. Reston, VA: American Society of Civil Engineers.
- Driesen, D. M. et al. (2005). *An unnatural disaster: The aftermath of Hurricane Katrina*. Center for Progressive Reform (CPR) Publication #512. Washington D.C.: CPR.
- Eadie, P., Ela, M. A., & Tan-Mullins, M. (2017). *Poverty alleviation in the wake of typhoon Yolanda1, fieldwork: Working paper II*. UK: University of Nottingham. Retrieved 24 November 2017 from <http://www.projectyolanda.org/documents/working-paper-ii.pdf>.
- East-West Center (EWC) (2005) After the tsunami, human rights of vulnerable populations. Retrieved 17 February 2006 from <http://www.reliefweb.int/rw/RWB.NSF/db900SID/VBOL-6JEE3A?OpenDocument>, p. 77.
- Elliott, J. R., & Pais, J. (2006). Race, class, and Hurricane Katrina: Social differences in human responses to disaster. *Social Science Research*, 35(2), 295–321.
- Escobar, A. (1995). *Encountering development: The making and unmaking of the third world*. Princeton, NJ: Princeton University Press.
- Ferguson, J. A. (1994). *The anti-politics machine: Development, depoliticization, and bureaucratic power in Lesotho*. Minneapolis, MN: University of Minnesota Press.
- Few, R., Brown, K., & Tompkins, E. L. (2007). Public participation and climate change adaptation: Avoiding the illusion of inclusion. *Climate Policy*, 7(1), 46–59.
- Foreign Aid Transparency Hub. (2016). Republic of the Philippines. Retrieved 21 June 2016 from www.gov.ph/faith/.
- Freudenberg, W. R., Gramling, R. B., Laska, S., & Erikson, K. (2009). *Catastrophe in the making: The engineering of Katrina and the disasters of tomorrow*. Washington, DC: Island Press.
- Funge-Smith, S. (2006) Tsunami fisheries impacts – Thailand, Asia-Pacific fishery commission briefing note: Tsunami impact on fisheries in Thailand. Retrieved on 18 February 2006 from www.fao.org.
- Fussell, E., Sastry, N., & VanLandingham, M. (2010). Race, socioeconomic status, and return migration to New Orleans after Hurricane Katrina. *Population and Environment*, 31(1–3), 20–42.
- Gibson, T. D., Pelling, M., Ghosh, A., Matyas, D., Siddiqi, A., Solecki, W., et al. (2016). Pathways for Transformation: Disaster Risk Management to Enhance Resilience to Extreme Events. *Journal of Extreme Events*, 3(01), 1671002.
- Gilpin, R. (1987). *The political economy of international relations*. Princeton, NJ: Princeton University Press.
- Hagiwara, A. T., & Sugiyarto, G. (May 2005). *Poverty Impact of the Tsunami: An initial assessment and scenario analysis*. Manila: Asian Development Bank.
- Harden, M., Walker, N., & Akuno, K. (2007). *Racial discrimination and ethnic cleansing in the United States in the aftermath of Hurricane Katrina: A report to the United Nations’ Committee for the Elimination of Racial Discrimination*. Geneva, Switzerland: Office of the United Nations High Commissioner for Human Rights (OHCHR).
- Harvey, D. (2003). *The new imperialism*. Oxford, U.K.: Oxford University Press.

- Harvey, D. (2006). *Spaces of global capitalism: Towards a theory of uneven geographical development*. London, U.K.: Verso.
- Hayward, B. M. (2012). Rethinking resilience: Reflections on the earthquake in Christchurch, New Zealand, 2010 and 2011. *Ecology and Society*, 18(35–40), 37.
- Henkel, K. E., Dovidio, J. F., & Gaertner, S. L. (2006). Institutional discrimination, individual racism, and Hurricane Katrina. *Analyses of Social Issues and Public Policy*, 6(1), 99–124.
- Heynen, N., & Robbins, P. (2007). The neoliberalization of nature: Governance, privatization, enclosure and valuation. *Capitalism Nature Socialism*, 16(1), 5–8.
- Hinchcliffe, S., & Woodward, K. (2004). *The Natural and the Social: Uncertainty*. Change, Routledge, London: Risk.
- Holling, C. S., Gunderson, L. H., & Ludwig, D. (2002). In quest of a theory of adaptive change. In L. H. Gunderson & C. S. Holling (Eds.), *Panarchy: Understanding transformations in human and natural systems* (pp. 3–22). Washington DC: Island Press.
- Hopkins, J. (2011). Cera bill threatens democracy Accessed July 10, 2017 <http://www.stuff.co.nz/the-press/opinion/4885510/Cera-bill-threatens-democracy>.
- Hoogvelt, A. (1987). *Globalization and the postcolonial world: The new political economy of development*. Baltimore, MD: Johns Hopkins University Press.
- Igoe, J., Neves, K., & Brockington, D. (2010). A spectacular eco-tour around the historic bloc: Theorising the convergence of biodiversity conservation and capitalist expansion. *Antipode*, 42(3), 486–512.
- Innis, L. B. (2007). A domestic right of return? Race, rights, and residency in New Orleans in the aftermath of Hurricane Katrina. *Boston College Third World Law Journal*, 27(2), 325–373.
- Insurance Council of New Zealand (2017). <http://www.icnz.org.nz>. Accessed July 10, 2017.
- Kates, R. W., Colten, C. E., Laska, S., & Leatherman, S. P. (2006). Reconstruction of New Orleans after Hurricane Katrina: A research perspective. *PNAS*, 103(40), 14653–14660.
- Keys, A., Masterman-Smith, H., & Cottle, D. (2006). The political economy of a natural disaster: The Boxing Day Tsunami, 2004. *Antipode*, 199–200.
- Klein, N. (2008). *The shock doctrine: The rise of disaster capitalism*. New York, NY: Picador.
- Lagmay, A.M.F. (2014) Devastating storm surges of Typhoon Yolanda, Nationwide Operational Assessment of Hazards (NOAH). Available at: <http://blog.noah.dost.gov.ph/2014/06/02/devastating-storm-surges-of-typhoon-yolanda/>. Accessed 28 October 2016
- Laska, S., & Morrow, B. H. (2006). Social vulnerabilities and Hurricane Katrina: An unnatural disaster in New Orleans. *Marine Technology Society Journal*, 40(4), 16–26.
- Little, P. D. et al. (2001). Avoiding disaster: Diversification and risk management among East African Herders. *Development and Change*, 32(3), 401–433.
- Long, J., Giri, C., Primavera, J., & Trivedi, M. (2016). Damage and recovery assessment of the Philippines' mangroves following Super Typhoon Haiyan. *Marine Pollution Bulletin*, 109(2), 734–743.
- Low, N., & Gleeson, B. (1998). *Justice, society, and nature: An exploration of political ecology*. London, U.K.: Routledge.
- Lowe, J. S., & Shaw, T. C. (2009). After Katrina: Racial regimes and human development barriers in the Gulf Coast region. *American Quarterly*, 61(3), 803–827.
- Luft, R. E. (2008). Looking for common ground: Relief work in Post-Katrina New Orleans as an American parable of race and gender violence. *National Women's Studies Association Journal*, 20(3), 5–31.
- Lum, T., & Rhoda, M. (2014). Typhoon Haiyan (Yolanda): U.S. and International Response to Philippines Disaster. *Current Politics and Economics of South, Southeastern, and Central Asia*, 23(2), 209–246.
- Magtulis, P. (2016). *Delays seen in release of Yolanda funds*. The Philippine Star. 7 November Available at: <http://www.philstar.com/nation/2016/11/07/1641079/delays-seen-release-yolanda-funds>. Accessed 15 November 2016.
- Mamula-Seadon, L., & McLean, I. (2015). Response and early recovery following 4 September 2010 and 22 February 2011 Canterbury earthquakes: Societal resilience and the role of governance. *International Journal of Disaster Risk Reduction*, 14, 82–95.
- Masozera, M., Bailey, M., & Kerchner, C. (2007). Distribution of impacts of natural disasters across income groups: A case study of New Orleans. *Ecological Economics*, 63, 299–306.
- McCarthy, J. (2009). Commons. In N. Castree (Ed.), *A companion to environmental geography* (pp. 498–514). Oxford, U.K.: Wiley-Blackwell.
- Mileti, D. (1999). *Disasters by design: A reassessment of natural hazards in the United States*. Washington, DC: National Academies Press.
- Mitsch, W. J. (2014). When will ecologists learn engineering and engineers learn ecology? *Ecological Engineering*, 65, 9–14.
- Moe, T. L. (2010). Cleanup after Katrina: An analysis on policy, process, priorities, problems, and politics. *Disaster Prevention and Management: An International Journal*, 19(3), 314–332.
- Morgan, Jane et al. (2015). Monitoring wellbeing during recovery from the 2010–2011 Canterbury earthquakes: The CERA wellbeing survey. *International Journal of Disaster Risk Reduction*, 14, 96–103.
- National Fair Housing Alliance (2005). *No home for the holidays: Report on housing discrimination against Hurricane Katrina survivors*. Washington, D.C.: NFHA.
- Nelson, N., & Wright, S. (1995). *Power and participatory development: Theory and practice*. London, U.K.: Intermediate Technology Publications.
- Neumayer, Eric, Plümper, Thomas, & Barthel, Fabian (January 2014). The political economy of natural disaster damage. *Global Environmental Change*, 24, 8–19.
- Oh, C. H., & Reuveny, R. (2010). Climatic natural disasters, political risk, and international trade. *Global Environmental Change*, 20(2), 243–254.
- Olson, E. D. (2005). *The environmental effects of Hurricane Katrina*. Washington, DC: Natural Resources Defense Council.
- Oxfam. (2014). Beyond Safe Land: Why security of land tenure is crucial for the Philippines' post-Haiyan recovery. Joint Agency Briefing Paper, August. Available at <http://oxfamlibrary.openrepository.com/oxfam/bitstream/10546/324557/1/bp-beyond-safe-land-security-tenure-philippines-110814-en.pdf>.
- Paton, D., Johnston, D., Mamula-Seadon, L., & Kenney, C. M. (2014). Recovery and development: Perspectives from New Zealand and Australia. In *Disaster and Development* (pp. 255–272). Springer International Publishing.
- Paton, D. et al. (2015). Developing a comprehensive model of hazard preparedness: Lessons from the Christchurch earthquake. *International Journal of Disaster Risk Reduction*, 14, 37–45.
- Peluso, N. L., & Lund, C. (2011). New frontiers of land control: Introduction. *Journal of Peasant Studies*, 38(4), 667–681.
- Pieterse, J. (2001). *Development theory: Deconstructions/reconstructions*. London, U. K.: Sage.
- Poe, T. (2005, November 2). Congressman Poe announces funding for Sabine-Neches Waterway [press release]. Available at <http://poe.house.gov/press-releases?ID=E0A7494A-B24A-44B9-93DC-0E351CA900A2>.
- Potter, S. H., Becker, J. S., Johnston, D. M., & Rossiter, K. P. (2015). An overview of the impacts of the 2010–2011 Canterbury earthquakes. *International Journal of Disaster Risk Reduction*, 14, 6–14.
- Prudham, W. S. (2009). Commodification. In N. Castree (Ed.), *A companion to environmental geography* (pp. 123–142). Oxford, U.K.: Wiley-Blackwell.
- Robbins, P. (2004). *Political ecology: A critical introduction*. London, U.K.: Earthscan.
- Schlosberg, D. (1999). *Environmental justice and the new pluralism: The challenge of difference for environmentalism*. Oxford, U.K.: Oxford University Press.
- Schneider, H., & Liebercier, M.-. H. (Eds.). (1995). *Participatory development: From advocacy to action*. Paris: OECD.
- Scott, J. C. (1998). *Seeing like a state: How certain schemes to improve the human condition have failed*. New Haven, CT: Yale University Press.
- Seed, R. (2007). Re: New Orleans, Hurricane Katrina, and the soul of the profession [Letter from Ray Seed, Professor of Civil and Environmental Engineering to William Marcuson III, President, American Society of Civil Engineers]. Available at: http://aquadoc.typepad.com/files/katrina_and_soul_of_the_profession.pdf.
- Sovacool, B. K. (2017). Don't let disaster recovery perpetuate injustice. *Nature*, 549, 433.
- Sovacool, B. K. (2018). Bamboo beating bandits: Conflict, inequality, and vulnerability in the political ecology of climate change adaptation in Bangladesh. *World Development*, 102, 183–194.
- Sovacool, B. K., & Dworkin, M. H. (2014). *Global energy justice: Problems, principles, and practices*. Cambridge: Cambridge University Press.
- Sovacool, B. K., Sidortsov, R., & Jones, B. (2014). *Energy security, equality, and justice*. London, U.K.: Routledge.
- Sovacool, B. K., Heffron, R. J., McCauley, D., & Goldthau, A. (2016). Energy decisions reframed as justice and ethical concerns. *Nature Energy*, 16024, 1–6.
- Sovacool, B. K., Linnér, B. O., & Goodsite, M. E. (2015). The political economy of climate adaptation. *Nature Climate Change*, 5(7), 616–618.
- Sovacool, B. K., & Linnér, B. O. (2015). *The political economy of climate change adaptation*. Basingstoke UK/New York USA: Palgrave Macmillan and the Nature Publishing Group.
- Sovacool, B. K., Tan-Mullins, M., Ockwell, D., & Newell, P. (2017). Political economy, poverty, and polycentrism in the global environment facility's least developed countries fund (LDCF) for climate change adaptation. *Third World Quarterly*, 38 (6), 1249–1271.
- Spreng, C. et al. (2016). All hands on deck: Polycentric governance for climate change insurance. *Climatic Change*, 139(2), 129–140.
- Stevenson, J. R., Kachali, H., Whitman, Z., Seville, E., Vargo, J., & Wilson, T. (2011). Preliminary observations of the impacts the 22 February Christchurch Earthquake had on organisations and the economy: A report from the field (22 February–22 March 2011). *Bulletin of the New Zealand Society for Earthquake Engineering*, 44(2), 65.
- Stuff, (2011). Cera labelled militaristic. <http://www.stuff.co.nz/national/christchurch-earthquake/4919892/Cera-labelled-militaristic> (Accessed June 14, 2017).
- Suppasri, A. et al. (2015). A decade after the 2004 Indian Ocean tsunami: The progress in disaster preparedness and future challenges in Indonesia, Sri Lanka, Thailand and the Maldives. *Pure and Applied Geophysics*, 172(12), 3313–3341.
- Tan-Mullins, M., Rigg, J., & Grundy-Warr, C. (2007). Responses and resilience of fisherfolk on the tsunami event in Southern Thailand. In T. Doyle & M. Risley (Eds.), *Crucible for survival: Environmental security and justice in the Indian Ocean region* (pp. 116–129). London: Rutgers University Press.
- The Guardian. (2014). Christchurch after the earthquake, a city rebuilt in whose image? <https://www.theguardian.com/cities/2014/jan/27/christchurch-after-earthquake-rebuild-image-new-zealand>. Accessed July 10, 2017.
- The Press (2013). Is the rebuild worsening poverty in Christchurch? Accessed June 12, 2017 <http://www.stuff.co.nz/the-press/business/the-rebuild/9517254/Is-the-rebuild-worsening-poverty-in-Christchurch>.
- The Press (2016). 2017: When Christchurch finally goes from recovery to rebuild Accessed on July 10, 2017 <http://www.stuff.co.nz/the-press/business/the-rebuild/87880095/2017-when-christchurch-finally-went-from-recovery-to-rebuild>.

- The Press (2017). First steps into Christchurch's residential red zone Accessed July 10, 2017 <http://www.stuff.co.nz/the-press/business/the-rebuild/88711382/First-steps-into-Christchurchs-residential-red-zone>.
- Tudor, R. (2013). Social work in the Quake zone: Supporting the sustainable development of Christchurch's eastern communities. *Aotearoa New Zealand Social Work*, 25, 18–26.
- Turner, W. R., Bradley, B. A., Estes, L. D., Hole, D. G., Oppenheimer, M., & Wilcove, D. S. (2010). Climate change: Helping nature survive the human response. *Conservation Letters*, 3(5), 304–312.
- UNTV. (2016). NGOs urged halt of seawall project in Tacloban, accessed 1 July 2017 from: <https://www.untvweb.com/news/ngos-urge-halt-tide-embankement-seawall-project-tacloban/>.
- U.S. Environmental Protection Agency. (2006). Summary results of sediment sampling in response to Hurricanes Katrina and Rita. Washington D.C.: EPA. Available at <http://www.epa.gov/katrina/testresults/sediments/summary.html>.
- Van de Graaf, T., Sovacool, B. K., Kern, F., Ghosh, A., & Klare, M. T. (Eds.). (2016). *The palgrave handbook of the international political economy of energy*. Basingstoke UK/New York USA: Palgrave.
- Walker, G. (2012). *Environmental justice: Concepts, evidence, and politics*. London, U. K.: Routledge.
- Watts, M. (2016). The political ecology of oil and gas in West Africa's Gulf of Guinea: State, petroleum, and conflict in Nigeria. In T. Van De Graaf, B. K. Sovacool, A. Ghosh, F. Kern, & M. T. Klare (Eds.), *The Palgrave handbook of the international political economy of energy* (pp. 559–584). Palgrave.
- Weber, L., & Messias, D. K. H. (2012). Mississippi front-line recovery work after Hurricane Katrina: An analysis of the intersections of gender, race, and class in advocacy, power relations, and health. *Social Science & Medicine*, 74(11), 1833–1841.
- Wilson, G. (2013). Community resilience, social memory and the post-2010 Christchurch (New Zealand) earthquakes. *Area*, 45, 207–215.
- Wolf, E. (1972). Ownership and political ecology. *Anthropology Quarterly*, 45(3), 201–205.
- Wolff, R., & Resnick, S. (1987). *Economics: Marxian versus neoclassical*. Baltimore, MD: The Johns Hopkins University Press.
- Wood, A., Noy, I., & Parker, M. (2016). The Canterbury rebuild five years on from the Christchurch earthquake Available at: *Reserve Bank of New Zealand Bulletin*, 79, 3–16 <http://www.rbnz.govt.nz/-/media/ReserveBank/Files/Publications/Bulletins/2016/2016feb79-3.pdf>.
- Wright, B., & Bullard, R. D. (2009). Afterword: Looking back to move forward. In R. D. Bullard & B. Wright (Eds.), *Race, place, and environmental justice after Hurricane Katrina: Struggles to reclaim, rebuild, and revitalize New Orleans and the Gulf Coast* (pp. 265–274). Philadelphia, PA: Westview Press.
- Yamada, S., & Galat, A. (2014). Typhoon Yolanda/Haiyan and Climate Justice. *Disaster Medicine and Public Health Preparedness*, 8(5), 432–435.
- Yi, Carine J., Suppasri, Anawat, Kure, Shuichi, Bricker, Jeremy D., Mas, Erick, Quimpo, Maritess, et al. (2015). Storm surge mapping of typhoon Haiyan and its impact in Tanauan, Leyte, Philippines. *International Journal of Disaster Risk Reduction*, 13, 207–214.